

A DESCRIPTION OF THE ADULT AND LARVAL STAGES
OF A NEW SPECIES OF *PALAEMONETES*
FROM THE MARIANNE ISLANDS*

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TWO PLATES

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In August 1938 Dr. Masuzo Uéno kindly sent me some Palaemonid larvae taken by Professor Teiso Esaki in October 1937 from a brackish lake at Charanka in the island of Saipan, Marianne Islands. These appeared to belong to a species of *Palaemonetes* and, as it seemed important to establish their identity, I asked Dr. Uéno to send me also adult prawns from the same lake. At my request he has been good enough to send three specimens taken by Prof. Esaki at the same time from a small canal flowing out from the same lake. These specimens belong to a new species of *Palaemonetes*, which is here described. The identity of the larvae remains unproved; but it is reasonable to assume that they do actually belong to this species.

PALAEMONETES PACIFICUS, N. SP.

Two females of 30 and 36 mm, the former bearing eggs, and one male of about 20 mm.

Rostrum reaching end of antennular peduncle; crest high at base, with five dorsal teeth, sloping down to a long smooth straight edge; apex bifid; lower crest with four or five teeth, leaving anterior part bare. Carapace with very small antennal and branchiostegal spines, set on the margin. Somite 5 of abdomen $\frac{3}{5}$ length of somite 6.

Telson with pointed apex and two pairs of rather short spines, without feathered setae between.

Segment 1 of antennule with very small outer spine on the distal expansion, set well below anterior margin of this plate; the form of the plate differs very much from that of *P. varians*, but information

* Results of Professor T. Esaki's Micronesia Expeditions, 1936-1938, No. 26.

is lacking for several species, so that its value for systematic purposes is uncertain.

Outer flagellum with fused basal part of seven segments, very slightly longer than the free sensory flagellum which has about 6 segments.

Mandible without palp. Maxillipede 1 with well-marked cleft between coxa and basis; epidod oval, with deep incision in outer margin.

Leg 2 in egg-bearing female reaching with end of carpus to just beyond antennal scale. Dactyl little more than half length of palm; carpus twice as long as palm and distinctly longer than merus.

Pleopod 1 of female, endopod without appendix interna, and about one-third length of exopod, with long setae.

Pleopod 1 of male, endopod more than half length of exopod, without appendix interna, narrow at base and broadening out slightly towards end. Pleopod 2 of male with appendix masculina reaching less than half-way between end of appendix interna and end of endopod; bearing a number of rather short spines at end.

Size of eggs 0.8 by 0.67 mm.

The only other species of the genus which has a rostrum of the form described is *P. africanus*, Balss. Kemp (1925, p. 315) admits the possibility that the genus is not monophyletic, but remarks "The species, however, seem to constitute a reasonably compact group and, unless *P. africanus* is an instance, there is no evidence that the *styliferus* section of *Leander* (a section which predominates in brackish water in the Indo-Pacific region) has produced by the loss of its palp what would technically be a *Palaemonetes*."* The existence in this region of a species with the same form of rostrum seems to make independent derivation from *Leander* most probable.

THE LARVAE

Stage I. Length 3.1 mm (Figs. 6-9).

Rostrum as long as peduncle of antennule, smooth. Carapace without dorsal papillae or spines. Somite 5 of abdomen with dorso-lateral and lateral pleural spines. Telson spines nearly equal.

* I must plead guilty (1938, p. 15) to having repeated the error that *Palaemonetes* lacks the "pleurobranch" found in *Leander* on maxillipede 3. In *P. varians* and *P. pacificus* there are two gills on this appendage; but the small dorsal gill has the position of an arthrobranch rather than that of a pleurobranch.

Antennule with three aesthetes and a simple seta at end. Exopod of antenna with ten inner and terminal setae and two outer setae, the proximal one reduced to a small hair; apex with five distinct segments; endopod with seta and short spine.

Maxillule, endopod very small, unsegmented, with one seta. Maxilla with three inner lobes; endopod unsegmented, with basal lobe; exopod small, with five setae.

Maxillipede 1, endopod small, with two segments; coxa reduced, basis not prominent; epipod absent.

Maxillipedes 2 and 3, endopods alike, last segment with strong claw and about four stiff setae; exopods with eight setae. Carpus and propod of maxillipede 3 not distinct, and dactyl very short. Basis of maxillipede 2 not protuberant, with three very small setae; coxa minute.

Large biramous rudiments of legs 1 and 2.

Stage II. Length 3.15–3.36 mm (Figs. 10–12).

Carapace with one dorsal toothed spine and supraorbital spines. Rostrum slightly upturned at tip. Somite 5 of abdomen as in stage I. Telson as in stage I, but with very small additional median pair of spines.

Antennule with segment 3 marked off, and incipient stylocerite; endopod a minute bud. Antennal scale with four distinct segments and 13 inner and terminal setae, outer, setae the same; endopod about $3/4$ length of scale, with apical spine and two setae.

Maxilla, exopod with small, narrow, proximal extension and eight setae. Maxillipedes unchanged.

Legs 1 and 2 developed, exopods with eight setae.

Rudiments of two pairs of legs, the first of which is biramous. There are rudiments of two pleurobranchs, on legs 1 and 2, and cell-masses representing two more.

Stage III. Length 3.7 mm (Fig. 13).

Carapace with two dorsal teeth and small tooth at anterior angle. Somite 5 of abdomen without the dorso-lateral spine. Telson somewhat narrowed, with 7+7 spines.

Antennule, stem of three segment, otherwise unchanged.

Antenna, endopod slender, $2/3$ length of scale, with two basal segments and five small apical setae; scale without apical spine, with two small distal segments and 17 setae; one outer seta still present;

basis without spine.

Legs 1 and 2 unchanged. Leg 3 a large biramous rudiment; a small uniramous rudiment of leg 5, but no trace of leg 4. Four pleuro-branches present.

Pleopods absent. Uropods present, the endopod without setae. Anal spine absent.

Stage IV. Length 3.8 mm (Figs. 14 and 15).

Telson narrowed, length to width 1.55:1, apical spines 5+5.

Antennule scarcely changed. Antenna, scale with very small apical spine and trace of segmentation; endopod about $\frac{3}{4}$ length of scale, with two basal segments.

Leg 2, endopod longer and stouter than that of leg 3. Small rudiment of leg 4 and long unsegmented rudiment of leg 5. Five pleurobranches, the first four decreasing backwards, the fifth the largest and placed a little higher than the others. Pleopods absent; uropods fully formed.

Stage V. Length 3.5-4.1 mm.

This stage differs from stage IV only in having leg 5 developed, and the telson narrowed. Leg 4 still rudimentary. The width of the telson is now about half the length, with 5+5 spines as before.

Stage VI. Length 4 mm (Figs. 16-18).

Telson much narrowed, the length $3\frac{1}{2}$ times the width, with 5+5 apical spines and no lateral spines. Anal spine present, very small.

Antennule with stylocerite larger, but endopod still minute.

Antenna, endopod nearly as long as the scale with two basal and two distal segments. Maxilla with large exopod with many setae. Maxillipede 1 with bilobed epipod.

All legs developed, leg 4 with exopod. Leg 5 not greatly longer than the others. Five foliated gills, the fifth the largest. Pleopods present as minute buds.

This is the oldest stage represented, and it is certain that there must be one, and probably two, more in which the pleopods develop further and the first two legs become chelate.

Within the genus *Palaemonetes* development may be so much abbreviated that, in *P. mesopotamicus*, the young hatch with all the appendages of the adult, and without exopods on the legs (Sollaud,

1932), whereas at the other end of the scale *P. vulgaris* has a normal series of eight larval stages (Sollaud, 1923, p. 529). This species is found in shallow coastal waters, and penetrates into brackish water up the estuaries of eastern America.

The development of *P. vulgaris* is taken by Sollaud to represent the most primitive type found among the Palaemonidae. In the common European *P. varians occidentalis* the stages are reduced to five (Sollaud, 1923; Gurney, 1924).

The accompanying table, which is framed for comparison with those given by Sollaud for *P. vulgaris* and *P. varians*, shows that *P. pacificus* agrees with *P. vulgaris* very closely. It differs from it in having leg 2 developed in stage II, whereas it is not functional until stage III in *P. vulgaris*, and in the very late appearance of the pleopods.

In having leg 2 developed in stage II it agrees with *Leander* (e.g. *L. serratus*). There is, in fact, nothing in the development of *Palaemonetes* to justify separation from the genus *Leander*.

	Mxp. 3	Leg 1	Leg 2	Leg 3	Leg 4	Leg 5	Pl. 1-5	Uropod	Length
Stage I	En. Ex.	b	b						3.1
" II	"	En. Ex.	En. Ex.	b	—	s			3.15-3.36
" III	"	"	"	b	—	s		En. Ex.	3.7
" IV	"	"	"	En. Ex.	b	s		En. Ex.	3.8
" V	"	"	"	"	b	En.		"	3.5-4
" VI	"	"	"	"	En. Ex.	En.	s	"	4

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LIST OF PLATES

Palaemonetes pacificus, n. sp.

PLATE 5

Figs. 1-5 adult.

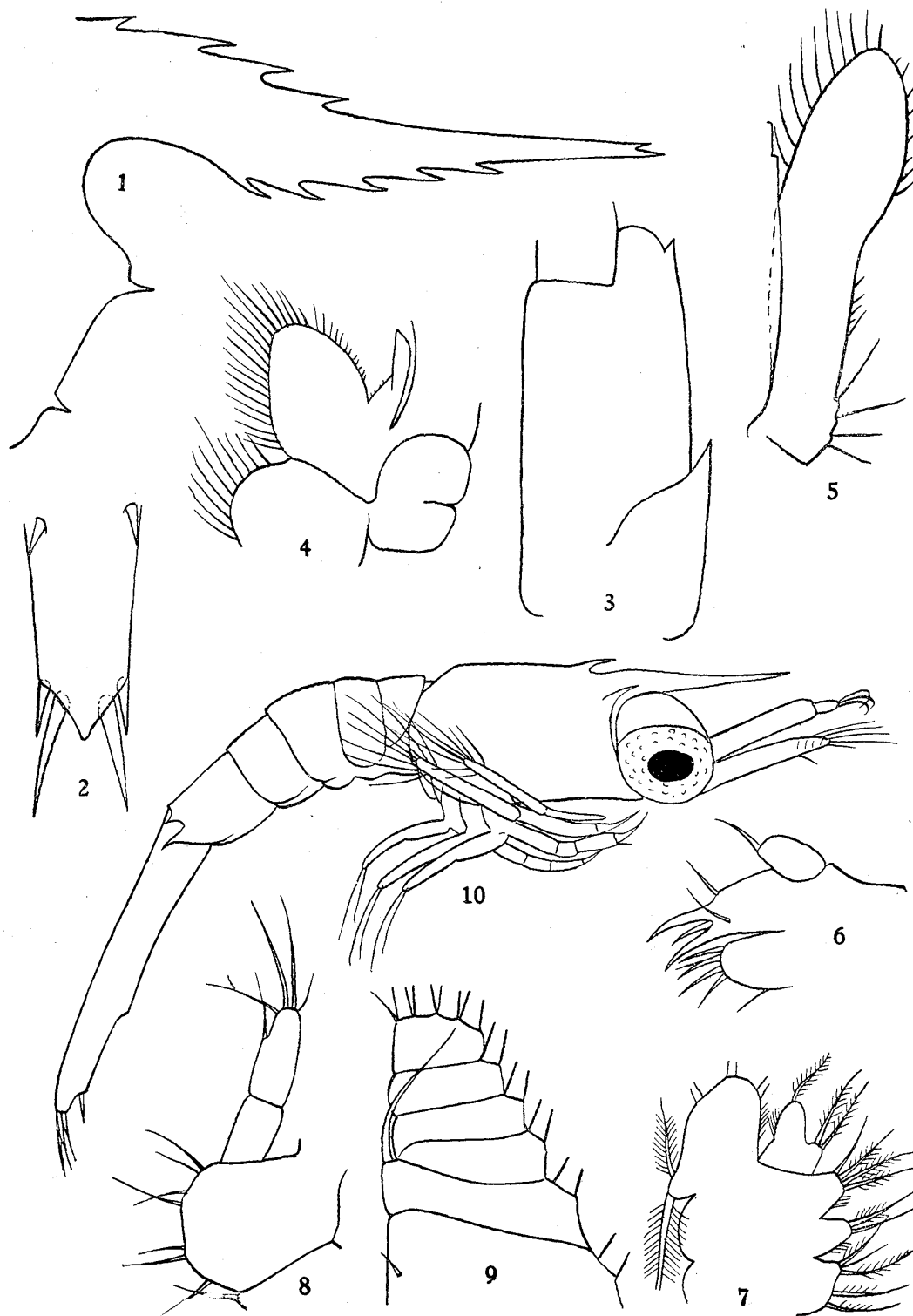
1. Female, rostrum.
2. " end of telson.
3. " segment 1 of antennule.
4. " maxillipede 1.
5. Male, endopod of pleopod 1.

Figs. 6-18 larvae.

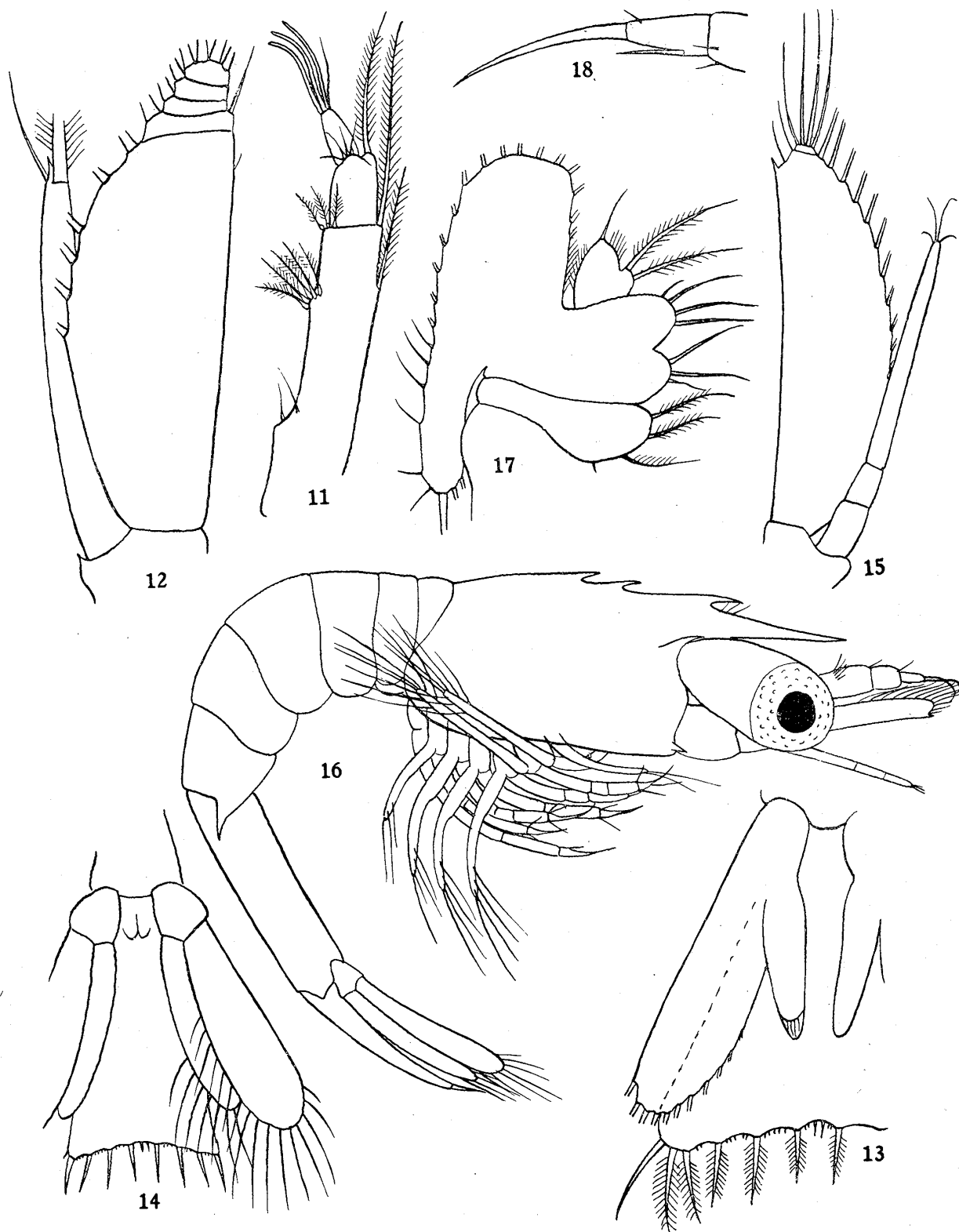
6. Stage I, maxillule.
7. " maxilla.
8. " maxillipede 1.
9. " part of exopod of antenna.
10. Stage II, side view.

PLATE 6

11. Stage II, antennule.
12. " antenna.
13. Stage III, telson.
14. Stage IV, telson.
15. " antenna.
16. Stage VI, side view.
17. " maxilla.
18. " dactyl of leg 5.



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